

NON-PUBLIC?: N
ACCESSION #: 8911080205
LICENSEE EVENT REPORT (LER)

FACILITY NAME: RIVER BEND STATION PAGE: 1 OF 4

DOCKET NUMBER: 05000458

TITLE: Reactor Automatically Scrammed During Surveillance Test Due to a Defective Test
EVENT DATE: 09/30/89 LER #: 89-035-00 REPORT DATE: 10/27/89

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 78

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: L. A. England, Director-Nuclear Licensing

TELEPHONE: 504-381-4145

COMPONENT FAILURE DESCRIPTION:
CAUSE: B SYSTEM: JE COMPONENT: 33 MANUFACTURER: G080
REPORTABLE NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

At 0340 on 9/30/89 with the unit at 78 percent power (Operational Condition 1), the reactor automatically scrammed during the performance of a routine reactor protection system (RPS) - main steam line isolation valve closure monthly surveillance test. The cause of the scram was determined to be a defective test switch in the reactor protection system. The defective General Electric switch (model CR 2940) had inadvertently placed the system in a conservative state allowing a scram to occur after a half scram signal was initiated as required by the surveillance test.

The test switch was replaced via a prompt maintenance work order. Prior to successfully completing the surveillance test, the procedure was revised to require verification of proper switch position prior to

performing the surveillance and upon restoration. The RPS system was returned to service.

The RPS System actuated per design in response to the defective test switch condition and the reactor scram placed the unit in a safe shutdown condition. There was no adverse impact on the safe operation of the plant nor to the health and safety of the public as a result of this event.

END OF ABSTRACT

TEXT PAGE 2 OF 4

REPORTED CONDITION

At 0340 on 9/30/89 with the unit at 78 percent power (Operational Condition 1) , the reactor (RCT) automatically scrammed during the performance of a routine reactor protection system (RPS) (*JE*) main steam line isolation valve closure monthly surveillance test. The cause of the scram was determined to be a defective test switch (*33*) in the reactor protection system control logic. This actuation of an engineered safety system is being reported pursuant 10CFR50.73(a)(2)(iv).

INVESTIGATION

An investigation into the cause of the event disclosed that the unexpected scram occurred when the main steam line 'C' inboard main steam isolation valve (MSIV) (*ISV*) test push button (B21H-S3K) was depressed

as directed by the monthly surveillance test procedure which was in progress. The performance of the procedure step should have resulted in only a half scram signal being received by the RPS trip channel 'C'. A review of the emergency response information system (ERIS) (*IQ*) scram data revealed the scram occurred from a trip signal being received on RPS channel 'D' immediately after initiating the trip on RPS channel 'C'.

A review of the RPS system elementary wiring drawings showed that testing the RPS main steam line isolation valve 'C' channel also causes relay (*94*) contacts C71-K3H in the 'D' trip channel to open. The opening of the C71-K3H contacts is not expected to result in a trip condition of the 'D' Channel because the contacts are bypassed when test switch C71-S6D is in the normal position.

Test switch C71-S6D is a General Electric Type CR 2940, ,Part No. 145C3040P022, key operated control switch. A visual inspection of the switch found the key slot of the operator indicating normal (mid)

position. When in the normal position, contacts 3 and 4 are designed to be maintained in the closed position. A volt meter was used to verify the position of the switch contacts; the actual switch state was found to have contacts 3 and 4 open. Immediately upon discovering the defective switch, a prompt maintenance work order was initiated to replace the switch.

The last previously documented successful operation of the defective switch (C71-S6D) was on 9/2/89 during the last performance of the RPS main steam line isolation valve closure monthly surveillance test. Data history from the plant process computer confirmed that the switch failure occurred on 9/2/89 during the restoration of the previous monthly surveillance test. No known indication was readily available to the operator identifying that the switch contacts failed to close when returning the switch to the normal position and removing the key, and the procedure did not point out where the information was available. The defective switch permitted contacts 3 and 4 to remain

TEXT PAGE 3 OF 4

open, allowing RPS trip channel 'D' to be left in a conservative state.

There have been no earlier LERs submitted by River Bend Station that involved a similar control switch. The root cause appears to be unique to the General Electric key operated control switch.

CORRECTIVE ACTION

Immediately upon discovering the defective switch, a prompt maintenance work order was initiated to replace the switch. In addition to replacing the switch, the RPS main steam line isolation valve monthly surveillance test procedure was revised to include instructions for verifying that the RPS test switches are in the proper position prior to performing the surveillance and during the procedure restoration. The RPS system was returned to service following the replacement of the switch and the successful performance of the revised surveillance test procedure.

As a result of a similar failure occurring during the bench testing of a replacement switch, a total of twenty three (23) spare switches of the same part number were obtained from the warehouse and bench tested. Tests conducted by Engineering found that the switch was capable of failing such that the key may be removed prior to contacts 3 and 4 making up in the normal position. Eight failures of this type were identified from the twenty-three (23) switches tested. Two switches identified as being defective have been sent to General Electric for failure analysis. GSU is also performing an independent failure analysis on the defective

switches. GSU reported this defect to the NRC pursuant to the requirements of 10CFR21.21 (b) (2) in a GSU letter dated 10/20/89 (reference RBG-31655).

After discovering the common failure mode of the switch,,a review was performed to identify other plant applications which utilize switches of this type. River Bend has confirmed that there are twenty four (24) safety-related control switches having Part No. 145C3040P22 that have been installed in plant applications, e.g., as internal components in the reactor protection system and automatic depressurization system. Engineering has verified that contacts 3 and 4 on each of the installed switches are properly made up for their intended applications.

A review was performed to identify the activities that require operation of the subject control switches. With exception of surveillance test procedure (STP) -051-0201, "RPS - Main Steam Line Isolation Valve Closure Monthly CHFUNCT" and STP-202-0602, "ADS Safety Relief Valve Operability Test", Engineering has determined that other applicable procedures contain sufficient instructions for verifying proper positioning of the switch contacts. STP-051-0201 has been revised to include additional instructions for verifying proper switch positioning prior to performance and during restoration and STP-202-0602 will be revised prior to the next scheduled performance.

TEXT PAGE 4 OF 4

SAFETY ASSESSMENT

The failure of the switch in the RPS placed the system in a conservative state. The RPS system actuated per design in response to the defective test switch condition and the reactor scram placed the unit in a safe shutdown condition. As a result, there was no adverse impact on the safe operation of the plant nor to the health and safety of the public as a result of this event.

NOTE: Energy Industry Identification System Codes are identified in the text as (*XX*).

ATTACHMENT 1 TO 8911080205 PAGE 1 OF 1

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File Nos. G9.5, G9.25.1.3

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Gentlemen:

River Bend Station - Unit 1
Docket No. 50-458

Please find enclosed Licensee Event Report No. 89-035 for River Bend Station - Unit 1. This report is being submitted pursuant to 10CFR50.73.

Sincerely,

J.E. Booker
Manager-River Bend Oversight
River Bend Nuclear Group

JEB/TFP/RGW/JHM/DEH/ch

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